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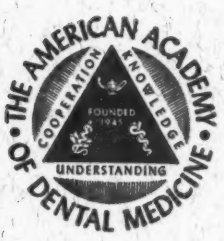

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(*Quoted from the Constitution*)

"To promote the study and dissemination of knowledge of the cause, prevention and control of diseases of the teeth, their supporting structures and adnexa and related subjects; and to foster and promote a better scientific understanding between the fields of dentistry and medicine."

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THE SIGNIFICANCE OF STRESS IN THE PRACTICE OF PREVENTIVE AND RESTORATIVE DENTISTRY*

CHARLES H. MOSES, D.D.S., M.Sc. (Dent.), *Toronto, Ontario*

When your essayist first began the practice of dentistry in 1924 he was indoctrinated with the concept that traumatogenic occlusion is one of the important causes of periodontal disease. This thought was relatively new at that time and some bitter controversies with regard to it raged in dental circles. Clinical evidence appeared to confirm this newer concept when the tissues of the periodontium improved after the teeth were ground to relieve overloading. The most difficult question to answer at that time, however, which came from those who were opposed to grinding was; "The Lord gave us enamel to cover the crowns of our teeth, why grind it away? Are we not opposing natural laws when we remove elements which are provided by nature?"

The correct answer was found much later.[1] After examining literally thousands of skulls, both human and animal; after viewing the skulls of people from every climate and every section of the world; after reading about and studying the photographs and casts of the skulls of early man, the real answer presented itself: *Man has worn through the enamel of his teeth from his very beginning.* Thus it appears that "The Lord giveth, and the Lord taketh away."

MECHANISM OF WEAR AND CHEWING EFFICIENCY

It is only in recent centuries that man has ceased to wear off the cusps of his teeth; this is due no doubt, to the absence of abrasive elements in the diet. In some parts of the world there is still sufficient roughage in the diet to cause the enamel to wear through. Animals also wear through the enamel. In fact wearing through the enamel to the dentin is part of a mechanism that makes for more efficient comminution of food.

When the softer dentin is reached it wears at a more rapid rate than the enamel. Hollows begin to form in the dentin, and inverted cusps, like those of Hall's artificial teeth, appear. (Fig. 1)

Fig. 1
Hollows formed in teeth like those of Hall's inverted cusps artificial teeth.

These hollows become food escapes and the harder rims of enamel become cutting knives. The occlusal surfaces which become flattened permit a longer slide during the completion of the masticatory stroke, adding to the shearing efficiency. Herbivorous animals also have a mechanism in which softer dentin within the harder folds of the enamel wears at a more rapid rate leaving cutting and shearing rims of hard enamel for better comminution of food. (Fig. 2) This has been man's chewing mechanism for countless centuries. Manly and Vinton[2] have demonstrated that efficiency increases as lateral movements become less restricted. The exteroceptor nerves which are responsible for the highly developed tactile sense in the mouth which tells us to avoid

* Presented at the Annual Meeting of the American Academy of Dental Medicine, Montreal, May 29, 1952.

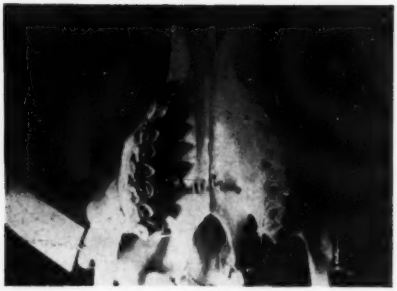

Fig. 2
Softer dentin between the folds of harder enamel wears at a faster rate in herbivorous animals making an efficient mechanism for comminution of food.

interfering cusps, and which often results in a restricted range of movement, now permit a longer slide.

EXTEROCEPTOR AND PROPRIOCEPTER NERVES

Your essayist believes that these exteroceptor nerves often protect us from relations of the jaws in which cusps will strike in malocclusion. They act like radar causing a subconscious movement of the mandible to adopt a position of greater comfort. This is one of the protective mechanisms which man has evolved.

Your essayist recalls the case of a senior student who complained of a severe radiating pain about the temporomandibular joint. Impressions were made, the upper cast was mounted on an articulator by means of a face bow. A centric relation was recorded with the patient in a relaxed position, the mandible being loose and mobile and chattered into a soft, thick piece of wax, not permitting any teeth to bite through. (The moment teeth are permitted to meet they tend to continue on to a previously established occlusion of convenience). The lower cast was mounted and the articulator permited to close after the wax was removed. It was discovered that in centric occlusion he was striking only upon the cuspid abutment of a fixed bridge that had been constructed about six months previously. The exteroceptor nerves about the teeth and the proprioceptor nerves which are located in the tendinous insertions at the condyles cooperated in avoiding this interference, causing the strain.[3] The patient protruded the mandible on the affected side to miss the tooth. Upon relieving the interference the pain completely disappeared. Many temporomandibular disturbances are due to the assumption of positions of greater occlusal convenience. These may not necessarily be the correct relationships. People with well worn teeth have no such restrictions. They generally have good centric and eccentric relationships, there being no interferences to induce abnormal positions to be assumed by the opposing jaws.

THE "ANATOMICAL" TOOTH CONCEPT

There is a school of thought, however, which clings to the concept that the newly erupted tooth with its unworn cusps is the normal mature tooth form. Indeed much of the teaching material at dental schools appears to be based upon this premise. So-called "anatomical" artificial denture teeth are carved for the purpose of obtaining efficiency in mastication and creating a balance in eccentric occlusion. The balance is achieved, of course, without a bolus of food interspersed. We all remember that catching sentence earlier in the century, "Enter bolus, exit balance."

When we teach tooth form to students, requiring them to carve teeth out of wax to the pattern of unworn teeth we inculcate a concept of "normal" which is difficult to eradicate later on. Inlays and crowns are generally carved in accordance with the tooth form as taught in their tooth carving days. Our orthodontists have also learned to interdigitate these well defined cusps in a standardized manner, each cusp falling into a definite sulcus. Prosthodontists have evolved a system of articulation whereby the cusps on artificial teeth not only interdigitate but balance tilting dentures, also, of course, as we have already mentioned, without a bolus of food interspersed.

The group led by Dr. B. B. McCollum[4]

is the most enthusiastic adherent to the idea that the unworn cusp form is normal, and goes to the extreme limits of the theory.

DENTISTRY AT CROSSROADS

Dentistry will soon have to decide whether the pattern of wear and the favorable mechanisms associated with it are the normal or whether the pattern of the unworn cusp is to be considered the more desirable.

Fig. 3
Dentition of a Jugoslavian man age 72. Note the stippled gingivae and excellent bone formation along with the wear on teeth.

Your essayist shall attempt to establish the rationale that: (1) Wear creates natural, mature patterns and pitch on each tooth with its consequent benefits; (2) Wear is also necessary on the deciduous teeth to affect a favorable occlusion on the permanent teeth; (3) That artificial teeth, inlays, crowns and pontics should be devised and arranged to simulate the pattern created by wear; (4) That the forces of wear teach us laws of direction of force which may be beneficially translated not only in the design for carving inlays and crowns but also in the arrangement of artificial teeth and (5) That the laws which we learn about direction of force may also teach us how to design our partial dentures so that the forces are favorable for the retention of abutment teeth. Traumatogenic forces are not only caused by malocclusing teeth; frequently appliances are made with clasps which are poorly designed, creating a horizontal load which is too severe. Rests and indirect retainers are often found to be incorrectly placed and become trauma-producing agents.

BENEFITS OF WEAR

Certainly the evidence is still available that people who wear the cusps off their teeth or demonstrate a pattern of wear on the incisal edges of the anterior teeth have heavier bone formation surrounding the teeth, possess healthier periodontal membranes and present pink, stippled gingivae. Box has pointed out the benefits of wear for many years[5] and has saved countless teeth by grinding them into a favorable articulation always keeping in mind the pattern evidenced by the wear. He termed this procedure "Occlusal Equilibration."

This is not to be interpreted to mean, however, that cusps are completely ground off in each case. Nature takes a long time to do this and the gradual process can not be affected in one or two sittings. However, this procedure will be discussed later in this paper.

The most convincing evidence of the benefits of wear is the fact that with very few exceptions, natural teeth found in the mouths of elderly people are those which have been worn. If cusped teeth are present at all they are likely to be artificial ones.

Examination of the teeth of tobacco chewers, who generally demonstrate much wear, reveals heavy and high alveolar bone and gingival tissues of good tone. Even teeth with soft hypoplastic enamel which often permits them to be worn down to the gingival line show heavy bone and pink stippled gingivae. There are, of course, some worn teeth which possess lesions caused by food impactions after the contact points are lost. In some primitives, simplex periodontitis is evident. The latter condition is caused by the upset of the local basic state either by direct or predisposing factors or both. Periodontitis simplex is a slowly progressing disease and does not destroy tissues as rapidly as does necrotic periodontitis and complex periodontitis. There are factors which cause periodontal disease other than

traumatogenic occlusion, as we shall see by the etiology chart. Occlusion, however, is a factor of prime importance. Figures 3 and 4 (courtesy of C. H. M. Williams) illustrate that wear is beneficial to the entire periodontium which consists of the gingival tissues, the periodontal membrane and the bone.

Fig. 4
Dentition of patient in Fig. 3. Note beautiful gingival tissues.

WEAR AND CONTINUOUS ERUPTION

Gottleib once pointed out that there is a mechanism of continuous eruption in the human dentition.[6] This no doubt is the evolutionary answer to the wear on teeth, caused by abrasive substances, which has been manifested on human teeth for many thousands of years. As the cusps wore off, the line of occlusion was maintained by eruption. Williams has pointed out to your essayist that the bone at the crest of worn teeth is maintained at a high level so that the clinical or exposed crowns remains the same in length if not in anatomical form. There were other factors of evolutionary significance. As the pulp chamber was approached by the wear the pulp receded and calcific deposits filled the chamber. This supplied tooth material when the wear reached the pulp and insulated against thermal shock.

WEAR AND DECIDUOUS TEETH

The cusps of the deciduous teeth of primitive people wear early. The enamel is softer than that of permanent teeth and appears to be designed to wear rapidly. Your essayist is of the opinion that cusps which are unworn on deciduous teeth and which interlock or interfere are inhibiting factors in the growth and development of the mandible. It does not require much pressure to retard growth. Box had brought to your essayist's attention the work of an orthodontist in Western Canada, McIntyre by name. During orthodontic treatment he was grinding the cuspids of deciduous teeth to remove interferences. Examination of skulls demonstrates the fact that the adults of primitive races tend to have an end-to-end occlusion of the permanent anterior teeth. This creates a favorable axial application of force, as we shall soon see, contributing towards a healthy periodontium.

When Dr. Moyers, Professor of Orthodontics at the University of Toronto left for Greece in the summer of 1951, he was requested by your essayist to investigate, if possible, whether there is a relationship between the wear of the deciduous teeth and an ultimate end-to-end occlusion of the permanent anterior teeth such as demonstrated by primitive dentitions. Dr. Moyers was continuing investigations which he had begun during the last war and which were chiefly concerned with caries and nutrition. These investigations were most interesting and added new information to our concepts of the etiology of caries. The site of his investigations was in a very remote and inaccessible part of Greece. The population was inbred and outside factors of inter-breeding were remote. His report will be published soon. The Greek children evidenced much

Fig. 5
Lateral view of Greek child. Note wear on deciduous posterior teeth.

wear on the deciduous teeth. Moyers upon his return stated that he was convinced of a relationship between the worn deciduous molars and the anterior end-to-end occlusion of the permanent teeth (Fig. 5). At the orthodontic clinic of the University of Toronto he has now instituted a system whereby the interfering cusps on the deciduous teeth are relieved by grinding.

Moyers made the important observation that the interdigitating cusps of the opposing permanent first molars fell into their exact permanent relationship in the Greek children rather than in the usual tip to tip cuspal relationship found in the eruptive pattern of our American children. This initial contact of the cusps of the opposing permanent molars is at present considered to be normal. The cusps ultimately fall either into the normal relationship or into a distal occlusion depending upon the mandibular development. Moyers believes that this might be due to the more rapid anterior growth of the mandible in the Greek children which is now freed from inhibiting factors. It would appear, therefore, that it would be good practice to reduce the cusps of deciduous teeth to simulate wear. There is not much danger and the advantages appear to be great.

PERIODONTAL DISEASE

In order to appreciate periodontal health, we should understand the causes of periodontal disease. As a basis for discussion, Box's chart on the etiology of periodontal disease will be reviewed:[7]

1. *Direct Factors*: Micro-organisms plus their products and the by-products of injured tissue; i.e. toxins, enzymes, etc.
2. *Predisposing Factors*:
   (a) *Local*: e.g. traumatogenic occlusion; incubation zones, etc.
   (b) *Systemic*: (1) presence of assisting causes e.g. nutritional deficiencies, hormonal disturbances, etc.
   (2) absence of preventing properties, e.g. lack of anti-enzymes. Box further states that; "The local basic state of the periodontal tissues is brought about by adaptation to its multiple environment which is the aggregate of all local and general factors. Any disturbing factor, local or general, which tends to deplete the reserve of the local basic state acts to upset the balance that has been struck between the tissue and its environment and to favor infection."

It will be evident then from the chart that traumatogenic occlusion is an important local predisposing factor which may be supplemented by other factors. *The local basic state is thus upset rendering the tissues favorable to attack by organisms.*

ANALYSIS OF OCCLUSAL FORCE

Which are traumatogenic forces and which are beneficial? It becomes evident that we must examine the components of the forces exerted upon teeth more minutely to answer these questions.

It has long been known that heavy function need not be traumatogenic. In some instances heavy function upon a tooth may be beneficial. Box describes the differences very well in his book while making a good case for wear:[8] "The viewpoint that the greater the functional or occlusal force becomes, the stronger will be the supporting bone would seem to need qualification. When the cusps have been worn down enough to produce mostly an axial loading, the bone receives the load over the entire alveolus. In consequence, heavy function tends to be beneficial and may be increased considerably without the danger of overloading. However, in the writer's opinion great increase in functional stress that acts on the tooth more or less horizontally and is sustained by the periodontal membrane and bone regionally instead of generally is frequently outside the limits of the tissues and is not beneficial."

Pressures may be relatively light and

yet produce lesions while in some cases the load upon a tooth may be heavy but beneficial.

Gottleib stated that "Wherever possible pressure is translated into traction. This is answered by bone deposition. This is not only the case with muscle insertions but also in the suspension of our teeth."[9] It may be stated that a tooth under function is suspended by its periodontal fibres. If the direction of force on that tooth is axial, all the fibres which encircle the tooth are engaged in the work required. The load is thus divided and the alveolar bone as well as the fibres sustain the load generally. Heavier bone deposition is encouraged, as Gottlieb has stated. This could be the explanation for the heavy alveolar bone which is generally seen on worn teeth. The moment the angle of the direction of force deviates from the vertical, a horizontal component is introduced and the load is now borne by both the bone and the fibres regionally instead of generally. Push and pull zones are created. In the pull zone areas fewer fibres now receive the load which may be too great in the smaller area acted upon. The fibres of the periodontal membrane may become torn or otherwise injured, while on the tooth surface, particles of the cementum may be broken away if the force is sufficient. In the push zones the areas may be affected by pressure atrophy or ischemia. The local basic state is therefore upset.

There is no better example that axial loading is the most favorable pressure on the teeth than that demonstrated by the lower anterior teeth as a group. They are usually the last teeth to be lost in periodontal disease. The direction of force on lower anterior teeth is usually axial. Should wear be observed on these teeth the bone will usually be high and broad.

ORGANIZATION OF TISSUES AS RELATED TO FUNCTION

It is a known fact that some of the tissues have the ability to organize to meet function. The trabeculae in bone arrange themselves into a favorable pattern to meet both the direction and intensity of a load. When the function is heavy but within the limits of tissue tolerance the pattern of the trabeculae becomes so arranged that the load is adequately met. The mineral content of the bone also becomes greater and the bone generally hypertrophies becoming greater in mass quantity.

The periodontal membrane also possesses the property of organization. The fibres of a tooth organize like bone into a favorable pattern to meet function. A tooth which is out of function is held by fibres which appear to be less organized, containing an abundance of loose tissue between them. It is sometimes advisable to place teeth which have been functionless for a long period of time into an intermediate state of relatively light function before permitting them to act as abutments in fixed or removable appliances. Breakdown often occurs in such teeth because the quality and organization of the tooth, the bone and the periodontal fibres are in a stage that is inadequate to meet suddenly the great task required.

This phenomenon of reorganization has frequently been observed by your essayist after a mouth has been rehabilitated by restorations, grinding or a combination of both. This process of reorganization often requires repeated corrections. Occlusal relationship is not static but undergoes continual changes. Adjustments, therefore, should constantly be made. This would not be necessary if all the factors of wear were constantly present. At this point it would be most appropriate to point out that there are interceptors of the normal pattern of growth.

INTERCEPTORS OF NATURAL DEVELOPMENT

Generally speaking nothing is static in nature. This is very true about teeth and jaws. In the jaws the mandible retains the growth centre at the condyle. Keith once stated that if man were permitted to live to an age of two hundred years, the appearance of his mandible would be similar to that of an acromegalic.[10]

This in itself would indicate that there is little likelihood of a static permanent centric relationship since the mandible continually has the growth potential. People with worn natural dentitions gradually accommodate to this ever-changing condition. People of modern society with the interlocking cusps on their teeth present an inhibiting factor to this growth pattern. It is appropriate to point out here that our modern dental restorations such as inlays with deep cusps and non-wearing contact points, fixed bridge work and partial dentures which might arrest growth are also inhibiting factors which might create a disorganized unrelated pattern of development in the mature dentition.

Even our concept of contact points is not the pattern observed in the mature, worn dentitions of primitive people. They generally present an interlocking joint contact. This indicates that wear also takes place in the proximal areas.

HAY'S WORK

G. E. Hay,[11, 12] a mathematician and physicist who studied under a research grant at the University of Toronto demonstrated in two studies that when the direction of force is axial the bone surrounding the tooth absorbs the load equally over the entire surface. Hay also demonstrated that the relatively small area at the apex receives pressure within the limits of tissue tolerance.

To simplify his rather involved mathematical studies, it might be stated that when a force of three ounces is applied axially upon a conical tooth, the pressure at the apex is twenty-two pounds per square inch. When the same force is applied at an angle of forty-five degrees the pressure at the gingival fulcrum becomes twenty-seven pounds per square inch and thirty pounds at the apical region on the same side on which the pressure is applied. The latter pressure may be excessive for that particular area at that particular time, depending upon tissue tolerance which is variable and is influenced by many factors. Twenty-two pounds may be within the limits.

Ischemia or depletion of blood in the area due to the pressure may be of a constant and severe nature and may cause bone resorption. It is claimed by some that sustained pressure and ischemia are two of the mechanisms utilized in tooth movement by orthodontists. If the trauma is severe, repair may only be achieved by a rear resorption (Gottleib), and a rather severe lesion may be created.

Periodontal pockets, however, are usually formed at the pull zone areas which are on the opposite sides of the push zones in the gingival sector. When there are positive pressures on the push zones, there are negative areas of pressure in the pull zones as demonstrated in Hay's diagrams. In the latter areas the fibres are strained severely and the cementum receives forces of traction. If some of these forces are excessive the fibres in the local areas may be injured or pieces of cementum may be fractured off. There is also a pull zone present near the apex on the opposite side of the gingival pull zone. Why, then, does the pocket form at *gingival* pull zone? The direct factor, namely organisms, fits nicely into the explanation of this picture. Not only do organisms originate in the gingival tissues, proving that periodontal disease comes from without, moving inward, but their products and indirect agents some of which are of a necrotizing nature, deepen the pocket at this weakened point. The lateral spreading epithelium soon follows in maintaining the pocket. Your essayist who has seen many slides under the microscope showing the organisms and their havoc agrees whole-heartedly with Box's theory on periodontal disease. He is convinced that the direct factors are organisms and their products which coming from without are permitted to invade the tissues when the predisposing factors both local and systemic are favorable.[13] Box does not hold the view that the disease process progresses from within outward which some periodontists believe and which is described by the term periodontosis.

ORGANISMS

Organisms and their extracellular by-products form the important direct factor. Organisms generally have a favorite medium. This is the story of evolution. Specific organisms which are found in a tissue and are virulent are the ones which have adapted themselves to a specific environment created in that tissue. Man is the most versatile of all creatures, adapting himself to many types of environments. Other forms of organized life are not so well adapted, however.

Tropical animals and plant life can not exist in colder regions. Arctic animals and plants can not exist in warm regions. Some forms of life thrive best in dry regions, some need water, some require less oxygen, some need more. The organisms found to be active in periodontal disease are present because a suitable soil is present for their existence and through evolutionary processes they are adapted to that type of soil. Like other organisms they require a specific environment which is created for them by the predisposing factors.

When Box made the tentative assumption from microscopic findings that certain fungus-like organisms and associated free forms have a causative relationship with at least one form of periodontal disease, he was well aware that he was dealing with a contentious subject. He began to form his opinions after the examination of many sections in which the pocket contents remained "in situ" following their preparation. We are all aware that this is not the case with the average specimen. When the specimen is intact it permits more detailed observations. Knowing also that the standard process of making smears for staining breaks up certain forms of resident fungoid formations, preventing a satisfactory study of them, Box began to employ a gentle *contact* method rather than the usual *spread*.

These large organism formations have been studied and described by numerous workers but there appears to be no unanimity about the nomenclature. Beust[14, 15] classified them with the algae-like fungae and regarded them as pathogenic. Back in 1916, Goodrich and Moseley[16] made this important observation: "We have not found this kind of branch (*of leptothrix colonies*) on perfectly healthy extracted teeth or in healthy mouths. We always found it on extracted teeth from advanced cases of periodontal disease. It usually abounds in periodontal pockets." Other workers who have made notable contributions in this field include Goadby, Dean and Dean, Aisenberg, Tunicliff and Mandel.

It is your essayist's opinion that one of the most important findings that Box ever made was the fact that there are necrotizing tracts which meander through the affected tissues destroying tissues in its pathway and continue on for considerable distances. These tracts are pathways of destruction. They emanate from surface lesions such as pockets and clefts. They can destroy bone, cut through connective tissue fibre bundles and even cut across nerve bundles. When the tract veers towards the tooth, cementoblasts have been seen destroyed giving further evidence of their necrotizing effects. They have been observed to destroy the walls of small blood vessels spilling their contents and creating local hemorrhages.

Perhaps it should be pointed out at this time that the necrosin of Menkin has been shown to contain collaginase.[17] That is, an enzyme which hydrolyzes collagen. Necrosin is found in inflammatory exudates and is also produced in injured cells such as the epithelium of pocket walls. It seems highly significant also that Roth and Myers[18] have demonstrated the presence of collaginase in material cultured from periodontal pockets. The tracts are probably the results of mixtures of enzymes depending on the nature of the source. This might be cellular or from organisms.

The startling feature of tracts is that in many instances they continue on to the end of the section. Who amongst us dare say where this destructive process ends? The onus on dentistry is great. It is truer than ever now that the mouth is the gateway to disease.

If these organisms are present in the mouth and if it is true that organisms need a specific environment to thrive, the answer seems to be, then, to create an environment not suited to their well-being. Since traumatogenic occlusion is an important factor we must create an occlusion which will be of a minimum of advantage to the organisms. Clinical evidence would seem to indicate that although periodontal disease is present in primitive peoples it is much less prevalent than amongst our so-called civilized ones. We must not forget the other predisposing factors. They are important. Traumatogenic occlusion is not the only predisposing cause of periodontal disease. The upset of the local basic state may come from several directions but traumatogenic occlusion is one of the most important factors and must be corrected. It serves as a localizing factor.

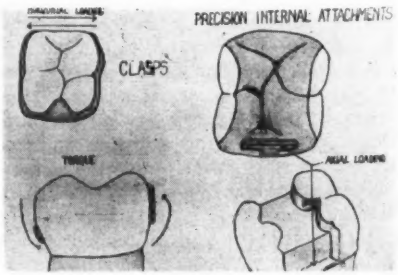

Fig. 6
Clasps tend to introduce a horizontal direction of force on a tooth. Internal precision attachments, however, tend to direct the force axially.

DIRECTION OF FORCE

The direction of forces upon a tooth or a saddle area must not be horizontal or the load becomes regional instead of general. In our planning of inlays, clasps, attachments and articulation we must alway aim for the direction of force upon teeth to be axial and upon saddle areas to be such that the load is distributed generally over the greatest possible area of the saddle. This can not be accomplished by carrying out the concepts generally accepted to be normal. We must cease to carve inlays and crowns with high cusps, they introduce horizontal loadings; we must minimize the use of artificial teeth with high cusps as well as circumferential clasps (Fig. 6) and bar clasps which direct the force horizontally so that the pressure upon a tooth or a saddle area is over a small region rather than over a larger general area, distributing the load. Can these factors be introduced into the general practice of dentistry? Your essayist believes that they can.

THE PRACTICE OF DENTISTRY UTILIZING NATURAL PRINCIPLES

If it is agreed that physiologic occlusion is a principle factor in the maintenance of a healthy periodontium, and if the direction of force should be favorable in all dental procedures, it follows that the practice of dentistry must be so designed that some of these laws which we have culled from our studies of robust, natural dentitions are incorporated into our practice of dentistry. In fact, laws which encourage a vigorous periodontium should be the very foundation of our practice in every phase in which they might be employed.

Your essayist suggests that the retention of the natural dentition could be prolonged for a greater period of time if the aforementioned principles were employed. Too much of our practice centres about the dental caries concept. Yet in truth probably 75 per cent of all the teeth lost through dental disease are lost through periodontal ailments. It would not be a bad guess, we believe, if it were stated that after forty-five years of age, ninety per cent of tooth loss was due to periodontal disease. It would follow then that our efforts should be bent more strenuously in the direction of preventing periodontal disease.

The average dental office practices first aid. If a tooth aches it is extracted; if a cavity appears it is filled; if a space occurs a bridge is inserted and if all the teeth are missing dentures are constructed. It may thus be seen that not only is the

long range view for dental health absent but the accent on procedure is one of convenience. The principle of prevention, which includes favorable occlusion, is often ignored until it is too late. In too many instances the patient becomes aware suddenly that all his remaining teeth are to be lost. The psychologic shock of losing the last group of teeth is too severe for most people, particularly those of the feminine variety. They generally feel that they are now relegated to the last era of their life. They are "over the hill." Youth is now far behind them and they can hear the scythe of the grim reaper working in a nearby field.

The average dentist of to-day and this includes your essayist, until recent years, gives far too little consideration to the thought and effort required to retain teeth. He is too prone to condemn them. A tooth should be innocent until proven guilty. It has been the pleasurable experience of your essayist to be able to retain teeth that have been condemned, utilizing various devices which we shall soon mention and restoring conditions of health to the periodontium. In some instances amazing results have been achieved in apparently hopeless conditions to the gratification of both the operator and the patient. The following method of procedure is suggested for the average practitioner.

THE CHILD PATIENT

Although your essayist is at present limiting his practice to prosthodontics and oral rehabilitation and has not for some years worked on the dentitions of children, he does feel that preventive work can and should be instituted very early in life. It has already been mentioned that favorable results on the permanent dentition, particularly the anterior teeth, might be anticipated if the deciduous teeth were equilibrated, the cusps being removed during the procedure.

As the permanent teeth appear, slowly, and at short intervals, say every three or six months, equilibration by grinding should be done so that the pattern of wear is gradually simulated and takes place over a long period of time. The wear should take place chiefly at the expense of the lower buccal cusps and the upper lingual cusps. This brings us into the discussion of the method of grinding teeth.

GRINDING PROCEDURES IN OCCLUSAL EQUILIBRATION

There is no unanimity on the subject of occlusal equilibration. The goal is a common one, namely, to divide the occlusal force amongst as many teeth as possible. To this should be added the attempt of another group to obtain a direction of force on each tooth which is axial. However, there have been several procedures advocated. One method encourages the retention of the immature tooth form pattern, namely cusps. They therefore remove interferences, affect equilibration of the load but grind in such a manner that cuspal form is maintained. The retention of cusps means the retention of the horizontal component of a force which is, in our opinion, traumatogenic. When cusps are removed the force is converted into an axial direction. Unquestionably cusps introduce a horizontal component, particularly with a bolus of food between the occluding teeth. There is also a school of thought which believes that because the vertical dimension must be maintained, the commonly occluding cuspal factors, namely, the upper lingual and the lower buccal cusps, should not be greatly interfered with otherwise the patient might suffer from overclosure.

This school does not take into consideration the natural laws which have for perhaps millions of years worked to man's advantage. One may be certain that if evolution means adaptation to an environment, favorable factors must have been evolved not only to compensate for but to take advantage of the fact that wear has always taken place on the lower buccal and the upper lingual cusps. After viewing literally thousands of skulls and seeing that this has always taken place in

nature and with the knowledge that, generally speaking, nature attempts to evolve favorable mechanisms for any situation, your essayist is hesitant to oppose nature and to introduce mechanisms which are the exact opposites of the natural pattern.

The pitch of teeth in most primitives is generally in an anti-Monson fashion as has been demonstrated in previous articles by your essayist.[19] It is not suggested, however, that in the average modern person this be introduced since your essayist has also discovered the law that the pitch of a tooth is dependent upon the relative widths of the opposing jaws. The wear on teeth, however, is still the same, and in actual practice on normal dentitions, grinding procedures should be at the expense of the lower buccal and upper lingual cusps chiefly. This mechanism will also be of benefit in complete denture procedure as we shall soon see.

THE PATIENT WITH A COMPLETE, NATURAL DENTITION

Equilibration should be instituted as early as possible. The plan for procedure should be determined only after properly articulated study casts have been carefully studied.

In some instances grinding alone will suffice. This grinding should not be completed in one or two sittings nor over the entire mouth at once. It should be so arranged that proper intervals elapse for the purpose of adjustments of both the periodontal membrane and the bone to accommodate the new function and stress as well as to permit the compensatory eruptive process to adjust the line of occlusion if the teeth have been overground. If the remaining teeth are sufficient in number to act as stops, loss of vertical dimension need not be feared. This is another reason for not attempting the entire equilibration in one sitting. Repeated grindings will ultimately bring the opposing teeth into a favorable harmonious relationship.

In other cases it may be noticed that proper equilibration may only be performed by means of inlays or crowns while in still other cases it might be necessary to resort to a combination of both procedures.

Periodic and perhaps minute adjustment should be made several times each year because, as we have already pointed out, occlusion is not a static condition but is constantly undergoing alteration.

PARTIALLY EDENTULOUS CONDITIONS

The treatment varies with the nature of the case and the age of the patient. If fixed bridge work can be utilized, the same pattern of occlusal harmony should be carried out. Should there be any question about the ability of an abutment to carry a load, compound abutments should be utilized if possible.

Should it be necessary to restore the missing teeth by means of removable partial dentures, it is suggested that wherever possible those with internal precision attachments should be utilized. The female portions of these attachments must be within the perimeter of the tooth so that the load which is borne by the abutment tooth is in an axial direction. Your essayist has been able to intrude and tighten some of these abutment teeth where a clasp type of partial with its horizontal loading would have caused the teeth to be lost. Wherever possible the teeth on these partial dentures are of the flat-cusped variety. It is quite possible that, although all other factors of construction are correct, the high cusps of the artificial teeth are agents in the introduction of a horizontal force.

Where the metabolic factors are such that the periodontal tissues have a low tissue tolerance, it might be necessary to resort to splinting to divide the load amongst as many teeth as possible. Splinting is a great adjunct to the retention of mobile and weakly supported teeth. By means of splints it is often possible to reduce the load on a tooth to such a degree that it will come within the limits of tissue tolerance. However, it is not as simple a procedure as it would appear. Torque, not on the periodontal membrane, but on the splints becomes very great in

some instances, loosening the inlays from the teeth. Contrary to expectation inlays employed in splinting operations should have greater frictional retention than those which are not splinted. Wherever possible it is advisable to break the stress in splints with some of the inter-communicating links which are now obtainable.

Technique is a lengthy subject which can not be completely dealt with in this paper. However, general principles which your essayist believes are basic may be introduced into many methods of procedure to the benefit of the periodontium and saddle areas. It must not be taken for granted that correct occlusal equilibration is the panacea for dental ailments. The etiology chart suggests that there are other factors. However, if clinical experience may be used as a criterion, the procedures suggested in this paper are of great benefit and are important to the maintenance of a healthy periodontium.

COMPLETE DENTURES

Cusped teeth can be the prime factor which causes a denture base to shift or slide on the mucosa. With the ever changing of the mucous and submucous structures even though they are minute, accurate cuspal relationship can not be maintained. Your essayist recalls only one case which was worn for a considerable period of time and which maintained the original cuspal relationship. With flat cusped teeth the direction of force is axial and not horizontal as it is with a bolus of food interspersed. Even Gysi knew this as evidenced by his chart yet did not use flat cusped artificial teeth.

The anti-Monson pattern of wear as exhibited in the primitive's teeth may also be utilized beneficially in complete dentures. Dr. M. A. Pleasure and your essayist both arrived at the conclusion independently, without being aware of each other's work, that an anti-Monson pitch was a favorable mechanism for artificial teeth.

If it is of advantage that the load is distributed on as large an area of the mucosa as possible then two mechanisms noted in worn teeth may be employed. Firstly, flat-cusped teeth translate force vertically which is generally directly over the ridge, and secondly the anti-Monson pitch on lower teeth directs the force to a centre somewhere between the two ridges thereby making certain that the load is distributed on both ridges.

The angulation should not be overdone or the ill effects of steep cusps are introduced. This mechanism is also contra-indicated in small upper denture-bearing areas. Generally speaking, uppers are not a great source of worry while tipping lower dentures are common. This arrangement prevents most lowers from tipping.

Dentistry has progressed far during the past several decades. Some of the methods and thinking could be altered. This would, in some instances require a complete revision of our concepts of "normal." "The old order changeth, yielding place to new."

SUMMARY AND CONCLUSIONS

1. Wear on teeth is the normal physiologic process; absence of wear is an immature pattern of natural teeth.
2. Proprioceptor and exteroceptor nerves are utilized in a defense mechanism which induces the opposing jaws to avoid uncomfortable positions of occlusion.
3. Lack of wear on deciduous teeth inhibits the growth and development of the maxilla and mandible.
4. Teeth should be ground artifically to simulate natural wear. This should be a regular periodic procedure.
5. Centric occlusion is not constant.
6. Direction of force on a tooth in function should be axial.
7. Artificial appliances and teeth should be so constructed that the horizontal component is minimized and all forces should be directed axially.
8. The wear and pitch of natural teeth present laws which may be introduced beneficially in complete denture construction.

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Habits and Their Deleterious Effects

If you chew your finger nails, bite your lips or are prone to propping up your chin with your hand, you may cause damage to your gingivae and other mouth tissues as well as your teeth, according to an article in the September issue of The Journal of the American Dental Association.

Dr. John S. McKenzie, of Miami, Fla., consultant at the Veterans Administration Hospital at Coral Gables, Fla., said 36 "vicious" mouth habits have been listed.

"To these can be added many more, and unfortunately, all are detrimental to periodontal (gingival tissue) health," he said.

Dr. McKenzie said dental patients often are not even aware that they have these habits.

"Much can be learned by closely observing the patient in conversation, as a habit seldom exists without frequent repetition of it by an individual," Dr. McKenzie said.

He asserted that any habit involving clenching, grinding or rocking the teeth can be damaging to dental health.

The Florida dentist added that the mouth tissues may also be affected by the pressure caused by faulty closure of opposing teeth.

The pressure sometimes causes obscure headaches, tenderness at the temples and tenseness of face muscles, he said.

STRESS REMOVAL IN DENTAL PRACTICE WITH HYPNODONTICS*

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INTRODUCTION

If we had to treat automatons, dentistry would be simple. But, we treat people, most of them very complex individuals full of emotions and feelings. All patients have emotional problems; and more and more the dentist realizes that these problems may have a bearing on the level of the threshold of pain during dental treatment. Every dentist has patients who have had, at one time or another, sickness in the family, financial or marital troubles. Not only do they have to meet the budget; but they also develop pain in the oral cavity. Very often this is the time when the patients come to the office. At this moment, dental treatment becomes an "Alarming Stimulus."

GENERAL - ADAPTATION - SYNDROME

Hans Selye, the internationally famous Montreal physician and research worker has done outstanding work in endocrinology in its relation to the alarm reaction. His new concept is known as the *General adaptation syndrome and the diseases of adaptation.* Some physicians are of the opinion that his ideas may change the whole concept of medical treatment within the next 20 years. Selye speaks of the general adaptation syndrome as the "sum of all these non specific reactions of the body which ensue upon long continued exposure to stress." This, he states, is evolved into three stages: the *Alarm Reaction* in which shock and counter shock are evolved; the *Stage of Resistance;* and the *Stage of Exhaustion.* "It is different from specific defense reactions (*e.g.* serologic reactions) which produce a much greater degree of resistance but only to a specific type of damage."

When reading Selye's *Textbook of Endocrinology,* it is tempting to adapt these findings to dentistry. For example, in the chapter on Blood Pressure, an observation is made that there is an increase in the blood pressure following exposure to stress because of the discharge of adrenalin from the adrenal gland into the blood. Many of us have experienced such a case due to excitement and emotional tension.

Selye notes that blood clotting time decreases during the alarm reaction. Fibrin formation also is accelerated, partly due to adrenalin liberation. He states, "Studies have been made of all the metabolites during the course of the general-adaptation-syndrome. The functional and morphologic changes of the bone structure, the blood, the cardiovascular system, the lymphatic system the respiratory system, etc., all have been studied and evaluated."

I should like to quote one phase of Dr. Selye's text, that may have a bearing on the manner in which we may handle the type of patient described in the first part of this paper. Selye speaks of the clinical implications of the general-adaptation-syndrome. "Adaptation to our surroundings is one of the most important physiologic reactions to life; one might perhaps even go as far as to say that the capacity of adjustment to external stimuli is the most characteristic feature of living matter. It is not unexpected, therefore, that some of the most common diseases of adaptation play the same important role in pathology as the general-adaptation-syndrome in physiology."

The common diseases of adaptation due to the excessive responses of endocrines to stress are hypertension, periarteritis nodosa, nephrosclerosis, some types

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of nephritis, rheumatic diseases, some types of tonsilitis, and some types of diabetes. Other diseases of endocrines of a hypofunctional nature are Simmond's Disease (pituitary hypofunction) and Addison's Disease (adrenocortical hypofunction).

It would seem that Selye proposes that just as the thyroid controls the metabolic functions of the body, the hormones of the adrenals are liberated to control stress factors in the body. If there is an *alarm reaction,* these hormones go to work and there is a *stage of resistance.* If they are successful, the body can cope with situations. If they are unsuccessful, a *stage of exhaustion* follows with altered physiology and resultant pathology.

How does all this affect dental treatment? Mellars and Hermes[2] of Napa State Hospital in California have been able to show, by a unique experiment on excitable patients, that altered physiology occurred in periodontal tissues due to stress of environment.

Boyle[3] states that the S hormone, or sugar hormone, a type of steroid which inhibits bone formation, and is derived from the adrenal cortex, may have such an abnormally increased output during certain situations as to lead to osteoporosis. One of these situations is described in Selye's text.

The patient who develops a stomatitis whenever emotionally disturbed, is a familiar one. With the removal of this etiologic factor and without any local treatment, the patient gets well almost overnight. Harry Roth[4] of New York University has contributed a great deal to the nutritional etiology of periodontal disease. He has found that frequently the administration of large doses of vitamin C for short periods will clear up many such cases. It is interesting to note that Selye records a diminution of vitamin C during the alarm reaction.

In order to place these emotionally excitable patients, who are under stress of their environment, in a more receptive mood for dental treatment, a proper psychological approach is necessary. There are times when our patients should be briefed by the proper psychological approach in order to dispel their fears.

Bernard B. Raginsky,[5] a noted psychiatrist and an authority in the field of psychosomatic medicine says, "The induction of an anesthetic does not begin when the anesthetist places a mask on the patient's face but it begins at the time the patient is notified that he requires surgery." Today the anesthetist, wherever possible, interviews the patients beforehand. The patient is briefed so that he knows what to expect before surgery. Prior to the administration of an anesthetic, the patient is given a muscle relaxant, comparable to a light phase of hypnosis.

HYPNODONTICS

Dentistry now has an important adjunct in treatment, — hypnodontics, *Hypnodontics* is the term coined by a practicing dentist, Aaron A. Moss, of New Jersey. It maybe defined as "hypnosis in dentistry." It is not hypnosis for parlor tricks; it is not hypnosis for the stage; it is not hypnosis for medicine; it is not hypnosis for psychiatry; *it is hypnosis for dentistry!*

We all have had patients who were under such emotional strain, that treatment was practically impossible. They are the types who invariably make us feel that we want to close up the office for a month and take a vacation. These patients have fears; the fear of injection, the fear of a sharp point, the fear of drilling, the fear of noise. Their tensions mount when they are approached with the mask of anesthesia. This happens because they are afraid of the unknown. They are fearful of being mutilated beyond repair. They are afraid that we will operate before they have an opportunity to be completely anesthetized. There are many patients who have a fear of dying under a general anesthetic.

We learn what patients' fears are by taking a proper case history. When we observe that our patients have these fears, we attempt to give them a proper

concept of dentistry without discomfort. Hypnosis has been misused on the stage and by improperly trained individuals in much the same manner that, in years gone by, nitrous oxide was used for frivolity and called "laughing gas." For these reasons, it is essential that we remove the misconceptions concerning hypnosis.

WHAT HYPNODONTICS ACCOMPLISHES

Hypnodontics will completely relax our most apprehensive patient. Even our good patients dislike dentistry and welcome relief from its discomforts. While procaine and nitrous-oxide eliminate pain, they do not relieve apprehension. As a matter of fact, they very often add to it in some cases. Under hypnodontics, our patients consider dentistry an enjoyable experience. This may seem improbable. But with the use of hypnodontics, your professional life will become easier because you will have relaxed patients to treat. We can accomplish more, and do better dentistry without tensions and emotional factors to cope with. Those who wish to use hypnodontics as an adjunct to other anesthetics, will find that less of the latter can be used with greater effect. Your office will run smoothly, quietly and efficiently. It will be a revelation to you.

WHO CAN HYPNOTIZE?

Psychologists tell us that anyone can hypnotize. Anyone who will study seriously with qualified teachers—*not stage hypnotists,* but with certified teachers trained in dentistry, can become a hypnodontist. It is a dental problem and should be handled as such.

WHO CAN BE HYPNOTIZED?

Anyone can be hypnotized except an imbecile and certain psychotic individuals who should be referred for psychiatry. They are out of the realm of the general practice of dentistry. Children, beginning at the age of 5 or 6, are perfect subjects.

SOME POPULAR MISCONCEPTIONS OF HYPNODONTICS

Hypnosis is in no way related to mysticism, occultism, spiritualism, mindreading, extra-sensory perception, or any of the other isms! There is no personal power that the operator has over the individual There is no spell cast! There is no blackout. The patient is not asleep but in psychosomatic sleep comparable to a reverie or day dream. As a matter of fact, the patient may awaken himself.

ARE THERE DANGERS IN HYPNOSIS?

As an accepted adaptation of medical hypnosis to dentistry, there are no dangers. There is danger, however in using hypnosis for stage performance, for parlor tricks, or for medical or psychiatric treatment that is out of our province. We do not know what damage we may cause by exploring the subconscious and uncovering hidden drives and emotions. That is not dentistry. If we make mockery out of serious business by using hypnosis for entertainment, we take away from our standing as professional people. In using hypnodontics in the office, we should not in any way use stage tricks or embarrass our patients in any way. Hypnodontics should be handled with the same care as we do our surgery.

I would like to recount a case history to give you an idea as to how a properly trained dentist can use hypnodontics in his practice.

A white female, age 16, presented with a case history of anaphylactic shock with the use of procaine. Under hypnodontics, it was possible to remove a very large upper biscuspid from the palatal region without the slightest discomfort. We had complete anesthesia without the use of any other agent but hypnodontics. We were able to stop the blood flow completely during surgery and then had it resume to fill the alveolus upon completion. We have been able to maintain anesthesia in the area of surgery for as long a period as desired,— in this case for two weeks. We do not know why, when during surgery with hypnodontics,

the command is given to fill the socket with blood, it slowly begins to seep out of the bone structure and gradually fill the entire socket with blood. Some day we may have all the answers as to how the subconscious controls these body functions.

In the January 1952 issue of the "Journal of the American Medical Association," Sadove, Wyant, Gittleson and Kretchner,[7] write: "Reactions to local anesthetic agents are far commoner than is frequently assumed. . . . It therefore behooves the administrator to bear in mind constantly that all anesthetic agents, be they topical or administered by infiltration, have certain toxic potentials."

Their paper presents an understanding of the pathologic processes in these toxic reactions and classifies them. We do believe, that in dentistry, due to the use of procaine with vasoconstrictors diminishing the absorption rate, we do not observe many reactions other than apprehension, anxiety, talkativeness, tremors, twitching, shortness of breath, and delayed reactions.

It is interesting to note that the authors of the above paper state that procaine and epinephrin should not be used in coronary disease or in hyperthyroid patients. They also mention that even though cobefrin has been substituted for epinephrin, Tainter and Thordson state that procaine and cobefrin are potentially more dangerous to the circulation than epinephrin.

We do not advocate the discontinuance of the use of local or general anesthetics—but for that very rare patient who has a true toxicity, as evidenced by previous experience with anesthetics, hypnodontics is a very good addition to our armamentarium.

HYPNODONTICS IN OPERATIVE DENTISTRY

In operative dentistry, hypnodontics has it greatest value. First and foremost, it is used for complete relaxation. It is interesting to note that those teeth which have had restorations prepared under hypnosis are more comfortable than those in the same patient constructed with any other anesthetic. It is possible to prepare sensitive gingival cavities with hypnodontics. All of us know that preparation for porcelain jackets or cast veneer crowns is a trying procedure, both for the patient and the dentist. With hypnodontics it is possible to do these preparations without fuss and without discomfort. We can also control post-operative pain in these teeth until the time of cementation of the casting. Where these patients have excessive salivation, we control it without the use of drugs.

I remember a case many years ago of a female, age 23, who phoned me in the small hours of night that her upper lip was swollen, that she had a "pounding" headache and a severe throbbing of her upper right central. All of us know the condition of the pulp tissue of that tooth. It was possible, with hypnosis, to stop the headache immediately and relieve the entire pain for a period of three hours. The patient was able to get some sleep and present the next morning for emergency treatment. Others have reported similar experiences.

In many cases, we have controlled the laxity in children and adults as far as their toothbrushing habits were concerned. Proper brushing technics, particularly in periodontal treatment, have been given to patients in the condition of waking hypnosis so that they will follow through correctly. Bruxism also has been controlled with hypnodontics. In the field of full dentures, gagging is eliminated,—impressions can be taken without discomfort to the patient. With hypnodontics it may be possible to obtain the proper vertical dimension for full denture construction.

Practically every phase of dentistry may be included in this fascinating science. In orthodontics we also meet with youngsters who have a low threshold for pain. When appliances are inserted, they complain of the pain of pressure. Here, again, this pain can be removed immediately with hypnodontics.

CONCLUSION

We have attempted to present a proper concept of hypnodontics. With this concept, we have a basis for dealing with emotional problems that present during dental treatment. We have a basis for dealing with environmental stressor factors as they present themselves in dentistry. Let this serve as an introduction to an adjunct of dentistry which helps us treat the whole patient.

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BOOK REVIEWS

Principles of Internal Medicine. Edited by T. R. Harrison, Paul Beeson, William H. Resnick, George W. Thorn and M. M. Wintrobe, Philadelphia, The Blakiston Co., 1951. 1590 pp. illus. 2 vols. $18.00.

This new edition presents the common disorders of internal medicine. An attempt is made to integrate the pertinent contest of preclinical sciences with clinical medicine. The subject is approached not only from the standpoint of disorders of structure but also by way of abnormality, physiology, chemistry and disturbed psychology. This affords an insight into the scientific principles necessary for a rational understanding of the development, evolution and management of internal disease.

The classic approach with principle emphasis on specific diseases is inadequate. The modern approach is to understand the basic mechanism of the cardinal manifestations of disease. Part I deals with the cardinal manifestations of disease; Part II with physiologic consideration; Part III reactions to stress; Part IV metabolic and nutritional disorders; Part V with disorders due to chemical, physologic and biologic agents; all other parts include diseases or organ systems. The presentation is authoritative. The content clear cut. The therapeutic principle invaluable in everyday practice.

I. NEWTON KUGELMASS

Diabetes Control. By Edward L. Bortz, M.D,. Philadelphia, Lea & Febiger, 1951. 264 pp. $3.50.

This little volume is written for the diabetic patient. There are chapters on diabetic detection and control, as well as current impression on the nature of the disease, itself. All of our information concerning diabetes points to the fact that it can be controlled a lifetime. The modern plan of diet is more liberal. There is no longer the rigid restrictions that set the diabetic apart from his friends.

This helpful guide is invaluable for the parent of the diabetic child or the diabetic adult. It gives clear-cut directions for the care of the body and all its parts, the planning of meals, the controlling of weight, the psychiatry of everyday life, the prolongation of life, misconceptions about the disease and many questions and answers that diabetics usually ask. Finally, there is a table of food values.

I. NEWTON KUGELMASS

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Academy of Dental Medicine to Hear Symposium on Pain

A symposium on pain will be featured at the next meeting of the American Academy of Dental Medicine, to be held December 7, in the Hotel Statler, New York. Participants in the symposium will be Nathan Savitsky, Theodor Blum and Samuel C. Miller of New York; moderator will be Joseph L. Bernier of Washington, D. C. The discussion will be conducted 2-5 P.M. following a business meeting for members at 10:30 A.M. and a luncheon at 12.30 P.M.

All interested dentists are invited to the luncheon and symposium. Reservations may be obtained by writing to Willam M. Greenhut, secretary, 124 East 84th Sreet, N. Y., or Dr. Jack Englander, 2616 Hudson Boulevard, Jersey City, N. J.

Maryland Section Receives Charter

The night of June 24, 1952 was a memorable one for the charter members of the newly formed Maryland section. Our national president, Harold Gelhaar, presented the charter as his first official duty and congratulated the section on its successful bid for the 1953 National Convention. Dr. Gelhaar also administrated the oath of office to the following newly elected officers: Edward C. Dobbs, President; E. Henry Henrichs, Jr., Secretary-treasurer; Albert S. Loewenson, Jr., Editor; Irving Abramson, Delegate; and Walter I. Levine, Chairman of Convention. The remainder of the meeting was given over to preliminary discussion of convention plans.

MARYLAND SECTION

Seated (l. to r.): Alvin H. Berman; Edward C. Dobbs, Pres. Md. Section; Harold R. Gelhaar, National Pres.; Albert S. Loewenson, Jr.

Standing (l. to r.): Irving Abramson; Aaron Schaeffer; Walter I. Levine, Chair. 1953 Annual Meeting; E. Henry Hinrichs; Harry W. F. Dressel; David H. Willer; Robert E. Hampson; William W. Noel.

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1952-1953

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Turkenkopf, S. — New Jersey }
Auerbach, M. B. — New York
Becker, D. — New Jersey
Blass, J. L. — New York
Botwinick, L. — New York
Copperthwaite, W. H. — New Jersey
Older, L. B. — New Jersey
Roth, H. — New York
Sorrin, S. — New York
Wachtel, N. — New York
Witkin, G. — New York

ANNUAL MEETING

*Levine, W. I. — Maryland, Chairman

AID TO DENTAL STUDENTS

*Rosenthal, S. L. — Pennsylvania, Chairman

HISTORIAN

*Greenhut, W. M. — New York

PUBLICATION

*Arvins, A. N. — New York

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* In accordance with Constitution.

ANNOUNCEMENTS

Postgraduate Training in Periodontia and Oral Medicine New York University College of Dentistry

The Periodontia Department of New York University College of Dentistry, which has been giving postgraduate courses in this subject since 1926, announces that several different courses in Periodontia and Oral Medicine are available during the academic year, 1952-1953. The courses vary from full time participation to short courses for the busy practitioner. All courses are under the direct supervision of Professor Samuel Charles Miller.

PERIODONTIA 123A (intermittent, evening-afternoon)

This 20 hour course consists of a study of the following: etiology; pathology; diagnosis, prognosis of periodontal disease; equilibration of occlusion; gingival massage, instrumentation, conservative and radical treatment; acute necrotizing ulcerative gingivitis (Vincent's infection); drugs; diet; maintenance of mouth health; prevention, etc. Ten weekly, two hour sessions, Wednesdays, 7 to 9 p.m. (for first four sessions—lectures) and 4 to 6 p.m. (for last six sessions —clinical demonstration) October 8 to December 10, 1952. Tuition $130.00. Books $21.50. Instruments approximately $65.00. Rental fee $1.00.

PERIODONTIA 123B (intermittent, evening-afternoon)

Course 123A repeated. February 25 to May 6, 1953.

PERIODONTIA 123C (one week, morning-afternoon)

Review course, one week, June 1 to June 5, 1953. Monday through Friday, 9 a.m. to 4 p.m. Limited to previous periodontia postgraduate students. Tuition $130.00. No instruments required.

PERIODONTIA 124 (continuous, morning-afternoon)

This 90 hours course consists of a study of the following: etiology; pathology; diagnosis; prognosis of periodontal disease; equilibration of occlusion; gingival massage, instrumentation, conservative and radical treatment; acute necrotizing ulcerative gingivitis (Vincent's infection); drugs; diet; maintenance of mouth health, prevention, etc. Fifteen, six hour sessions, daily, Monday through Friday, 9 a.m. to 4 p.m., June 1 to June 19, 1953. Tuition $300.00. Books $21.50. Instruments approximately $65.00 Rental fee $1.00.

Ohio State University Offers Postgraduate Courses

The College of Dentistry, The Ohio State University, will present the following postgraduate courses in dentistry during the autumn of 1952:

Oct. 13-17	Clinical Oral Pathology and Diagnosis	Dr. H. B. G. Robinson
Oct. 20-24	Periodontics	Dr. John R. Wilson
Oct. 20-24	Full Denture Prosthesis	Dr. Carl O. Boucher
Oct. 27-30	Partial Denture Prosthesis	Dr. Victor L. Steffel
Oct. 27-30	Oral Surgery	Dr. D. P. Snyder
Nov. 17-21	General Anesthesia	Dr. Morgan L. Allison
Oct. 6-10 Nov. 3- 7 Nov. 17-21	Airbrasive Technic	Dr. John N. Bowers

Each course is given for five consecutive days, Monday through Friday, and the enrollment is limited to approximately ten per class. The fee is $50 per course with the exception of Oral Surgery and Airbrasive Technic for which a fee of $100 is charged.

Further information and application may be secured from the Postgraduate Division, College of Dentistry, Ohio State University, Columbus 10, Ohio.

Postgraduate Training at Tufts College Dental School

The courses in Periodontology and Oral Pathology listed below will be presented throughout the academic year of 1952 and 1953. Information may be obtained by writing to the Director of Postgraduate Studies, Tufts College Dental School, 136 Harrison Ave., Boston, Mass.

DPG. 202E—A Course & Series of Diagnostic Clinics in Oral Pathology
Evening Course Each Monday Evening for Eleven Weeks from
Nov. 10, 1952 to Jan. 19, 1953—6:30 p.m. to 9 p.m.
Tuition $100.00
Dr. Max Jacobs and Staff

DPG. 601—Participation Course in Periodontology
Each Monday for Ten Weeks from
Oct. 6, to Dec. 8, 1952 and

DPG. 602—Feb. 23, to April 27, 1953
Tuition $150.00
Dr. Irving Glickman and Staff

DPG. 603—Participation Course in Periodontology
April 20-24, 1953
Tuition $100.00
Dr. Irving Glickman and Staff

DPG. 604—The Kirkland Gingevectomy Technique
May 11-15, 1953
Tuition $100.00
Dr. Olin Kirkland

DPG. 605—Occlusal Equilibration
Each Monday for Five Weeks from
Jan. 12, to Feb. 5, 1953
Dr. Edward T. Fischer

New York Section of A.A.D.M. to Meet

The New York Section of the American Academy of Dental Medicine invites its members and friends to attend its meeting on Monday, October 20th, 1952, at 8:00 p.m. at the New York University College of Dentistry.

The speaker of the evening will be Dr. Leo Zach who will address the group on the "Variations of Gingivae." Dr. Zach is a member of the Pathodontia department of New York University Dental College, Research Associate at Montefiore Hospital, and associated with Long Island State University Hospital.

Forum on Children's Dentistry

"The Metropolitan Unit of the New York State Society of Dentistry for Children wishes to announce a Forum on Dentistry for Children. On November 7, 1952 at New York University College of Dentistry, starting at 7:30 P.M. the following program will be presented.

1. Dr. Harold Berk, Assistant Professor in Pedodontics, at the Tufts College Dental School, will talk on pulp capping and pulpotomy. It will be discussed by Dr. Joseph Obst, Director of Dentistry, at the Jewish Sanitorium and Hospital.
2. Table Clinics on Pulpotomy by Dr. Gerhard Schmeltz of the Murray & Leonie Guggenheim Dental Clinic and Dr. Melvin Bellet, Instructor at the College of Dentistry of New York University.
3. A group discussion, "The Economics of Dentistry for Children," moderated by Dr. James Jay and discussed by Dr. Lewis Blass.

All dentists in the Metropolitan Area and their guests are welcome."

MEDICAL VIEWS ON ORAL PROBLEMS

"AIR DENT" METHOD OF GRINDING TEETH*

To the Editor: I have had some patients who worked in dental offices, in which "air dent" methods of grinding teeth (applying abrasives with air pressure) have been used. These patients had respiratory infections, and they were concerned about the possibility of inhaling substances from air syringes. It there any occupational hazard connected with the use of these syringes?

MAVIS P. KELSEY, M.D., Houston, Texas.

ANSWER.—This question centers about the exposures for the dental operator; however, the reply must concern the patient as well. In this innovation, the abrasive applied represents a mixture of aluminum oxide and dolomite, which is calcium carbonate. In practice, the size is from 10 to 50 μ. About 30 gm. are involved in the average excavation. This is thrust on the tooth area under air pressure of 80 to 90 lb. The process is dry, and exhaust apparatus is required to remove the dusty fines. At times a local anesthetic is required as is usual for all such excavation methods. The operator is thus exposed to the damaging properties of local anesthetics. The method is such that no severe damage is imposed on soft tissues, but some particle imbedment into the mucosa takes place, with spontaneous extrusion in about 24 hours. There is a possibility that the operator may be exposed, more than with other methods, to flying infective material surrounding dust particles. Although neither aluminum oxide or dolomite (an alkali) is rated as conducive to substantial pulmonary injury, a theoretical risk is involved. Much depends on the ability of the operator to successfully make use of the exhaust appliance. Cold associated with compressed air is said not to be detrimental. It is, perhaps, too early to make a definite statement concerning this problem. Extensive investigations on undesirable agents are now under way. The air dent method, however efficacious, is not receiving wide application, owing to the high cost of the equipment.

* J.A.M.A. May 10, 1952.

URTICARIA*

To the Editor: A man, 52 years old, who is obese, feels that there is something wrong with him. I have consulted several physicians, and none of them can determine what it is. The patient has multiple lipoma nodules all over his body; some come and go, but others are permanent. Patches of urticaria nodules develop at various times of the day, and his upper lip gets swollen at times. This swelling occurs suddenly, lasts for two to six hours, and then quickly disappears. He also has psoriatic lesions between the fingers that sometimes cause itching. His bowel movements are regular, his urine is negative to all tests, and, except for the above symptoms, he feels well.

Epinephrine (adrenalin®) and other medications have been tried, without permanent results. Roentgen therapy, diets, saline laxatives, and baths, hot or cold have not corrected this condition. Can you offer any suggestions concerning this case?

ALFRED J. C. SCHWARTZ, M.D., Washington, Mo.

This inquiry was referred to two consultants, whose respective replies follow.—ED.

ANSWER.—This man apparently has chronic urticaria with lesions of angioneurotic edema. Lipomas are not expected to come and go, and the absence of fever and depressed scars eliminates the possibility of nodular nonsuppurative panniculitis. It also is likely that the itching lesions limited to the areas between the fingers are not psoriasis. Perhaps they are infectious lesions such as those caused by moniliasis. The source of his trouble, however, should be sought in hypersensitivity to either drugs, infections or foods, in a psychogenic cause, or in some unusual source, such as a physical factor, parasite, or inhalant. During the search for the source of the trouble, treatment should consist of administration of antihistaminic agents, colloid baths, and the application of soothing lotions.

ANSWER.—The presence of urticaria and angioneurotic edema cannot be debated. It is not so certain, from the description, that the nodules thought to be lipomas are actually composed of fatty tissue. The shifting pattern of these nodules suggests that they may also be of an urticarial nature. There is a type of urticaria in which the lesions are indurated and persist for long periods in the same sites. It may be justifiable, in this case, to section one of the nodules and to study its histological structure.

Basically, the urticarial aspect of this case resolves itself into two aspects, the etiology and the treatment. Urticaria and angioneurotic edema may be classified etiologically into two groups, allergic and nonallergic. For the allergic group, drug allergy ranks high in importance. Does the patient use antibiotics (even nose drops), aspirin, or other analgesic drugs, barbiturates, phenolphthalein, or other drugs? Foods can also cause urticarial lesions. Neither foods nor drugs are likely to give positive skin tests in such cases; hence a diagnosis must be made or eliminated by history, observation, drastically restricted diets, and ingestion trials. Infected tonsils, teeth, or

gallbladder may constitute a basis for the urticaria. Emotional and other nervous factors should not be disregarded; however, it must be admitted that the causes of a large percentage of cases of urticaria and angioneurotic edema still remain unsolved.

The most effective and simplest palliative therapy has been the use of antihistamines. Some patients require two or three times the usual recommended doses. The addition of ephedrine to the antihistamine may help. The occurrence of the lip lesion might be averted by avoidance of smoking or other possible local traumatic stimuli. Some physicians have found that histamine injections, beginning with small doses and frequently repeated, have been helpful. Various forms of nonspecific therapy have been tried. Corticotropin (ACTH) or cortisone would be worthy of trial if the condition fails to respond to other measures.

* J.A.M.A. May 24, 1952.

INTERMITTENT SWELLING OF CHEEK*

To the Editor: A 44-year-old white woman has an intermittent swelling of the right cheek. The swelling is diffuse, more pronounced on the inside, and involves the entire right cheek. The only symptom produced is a feeling of tightness in that side. It appears suddenly and lasts for varying lengths of time; however, slight fulness seems to be there at all times. This situation has existed for several months. The patient had two small calculi removed from the right submaxillary gland a few weeks prior to the onset of this swelling. She recently had an infected upper left molar tooth removed. She is now having symptoms suggesting the onset of menopause. A few years ago she was found to have gastrointestinal allergy to certain foods. She is emotional, highstrung, and occasionally over-indulges in alcohol. She also has a benign essential hypertension. Can you suggest therapy or diagnostic measures?

L. C. Bailes, M.D., Anderson, S. C.

Answer.—The previous occurrence of calculi in a salivary gland and the behavior of the present swellings lead one to think that obstruction of the parotid gland duct by inflammation or calculus is the most likely diagnosis. Theoretically at least, it might also be possible for edema of the duct or the gland itself to be produced by an allergic reaction, which would most likely be due to a food. If other features of the case not presented in the query do not fit in with these possibilities, an angioneurotic edema of the buccal tissues may be considered. Skin tests with foods may yield a clue in such an event, but trial diets would be more reliable and direct. It is recommended that a diet containing only wheat and egg and milk products be used for about 10 days. If no relief ensues, the opposite diet, that is, a wheat-egg-milk-free diet, should be tried. If either diet improves the condition, additions can be made at about three day intervals.

* J.A.M.A. March 8, 1952.

PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY*

To the Editor: In The Journal (146:768 [June 23] 1951) under Queries and Minor Notes is a question about pseudohypertrophic muscular dystrophy. While it is true that the cause of muscular dystrophy is unknown and no specific treatment for the disease has proved of value, definite benefit can be achieved through neuromuscular rehabilitation. In addition to the decline in function that occurs from the muscular degeneration in the dystrophic process, there is undoubtedly additional loss of muscle power, endurance, and skill, and further muscular atrophy from enforced inactivity and disuse. An intensive neuromuscular reeducation program overcomes the effects of disuse and results in significant decrease in disability, in spite of the steadily progressive character of the disease.

Since 1948, we have worked with 44 patients with progressive muscular dystrophy and have brought about significant improvement in most of these patients. In almost all of these cases the progress of the dystrophic process was so slow that although the disease process undoubtedly continued, the patients' ability to do things improved significantly. Other principles of rehabilitation that have been of value in the treatment of patients with progressive muscular dystrophy include self-care training, gait training, training of skills and occupational therapy, use of braces and assistive devices, and, in some cases, orthopedic surgery. Improvement in morale, psychological outlook, social adjustment, and vocational training and placement have been important in the rehabilitation process.

Herman Kabat, M.D.
Kabat-Kaiser Institute
2600 Alameda St., Vallejo, Calif.

* J.A.M.A. May 24, 1952.

REMOVAL OF STAIN FROM TEETH*

To the Editor: Can anything be done to remove the yellow bacterial stain from teeth and prevent its recurence?

Bernard Marcus, M.D., Raritan, N. J.

Answer.—The natural color of human teeth varies. Attempts to alter the basic color of the teeth frequently results in irreversible damage

to the superficial enamel. Owing to modern living and eating conditions, however, various deposits may form on the teeth, among which are mucinous film, materia alba, calcareous deposits, and green, black, and tobacco stains. The efficient removal of these deposits can be accomplished only by the dentist or by a trained dental hygienist. The procedures may include scaling, meticulous scouring with special abrasive preparations, and final polishing of the cleaned surfaces. Once polished, the surfaces can usually be kept free of recurrent stains or deposits by faithful adherence to an effective regimen for brushing the teeth, which must be learned under supervision.

* J.A.M.A., March 29, 1952.

GUM CHEWING AND DENTAL CARIES*

To the Editor: Is there evidence that a relationship between gum chewing and dental caries exists?

D. A. DOWELL, M.D., Omaha, Neb.

ANSWER.—The sugar content of commercial chewing gum is about 60% by weight. In experimental studies, the level of reducing sugar in the saliva (normally about 20 mg. per 100 ml.) rose to an average of 725 mg. per 100 ml. after five minutes chewing of a stick of commercial gum containing 500 mg. of glucose. At the end of 30 minutes the normal level was restored. It has been observed that in the presence of sugar the PH at the surface of the teeth in susceptible individuals falls below the level at which enamel is known to dissolve with rapidity. Further, experimental use of sugar-coated gum three times a day for 10 days was associated with a tenfold increase in the salivary lactobacillus count, a widely accepted index of caries susceptibility. More direct evidence is not yet available.

* J.A.M.A., March 29, 1952.

HALITOSIS FOR TEN YEARS*

To the Editor: A 33 year old single woman has had foul breath for 10 years. She states it is worse in the mornings, and worse with excitement or anger. There is no cough, or expectoration. She dates the onset of this trouble from the time of her father's death in an accident. Two years ago the patient was engaged to be married, but her fiancé married another girl. Since then the annoyance with the malodorous breath is much worse, and the patient fears she will lose her job because of it. The patient is always in a state of agitated depression, crying, and reiterating her unhappiness. Results of physical examination are negative except for pale boggy turbinates, mucoid pharyngeal discharge, and mild spasm of the large bowel. A tonsillectomy was done eight months ago, without relief. Since then the patient has had a postnasal drip with intermittent secondary infection, usually mild. The following studies have not disclosed abnormalities: (1) blood cell count and urinalysis (2) nasal smear for eosinophils, (3) x-rays of the sinuses, (4) chest x-ray, and (5) complete dental x-ray (the dentist said that dental hygiene is unusually good), and (6) gallbladder dye studies. This patient has not been helped by intensive antibiotic and antihistaminic therapy. With psychotherapy the patient's mental state is improving. Can you suggest any further diagnostic attempts and therapy?

DAVID LEE, M.D., *Los* Angels.

ANSWER.—Among the causes of halitosis are paranasal sinus infection, bronchial infection, smoking, colitis due to faulty fat metabolism, gastritis, esophageal diverticulum, chronically diseased tonsils, atrophic rhinitis, dental decay, low-grade infections of the gingiva, and accumulation of meat fibers between the teeth. From the history and findings presented, there is little doubt that the psychogenic component is a major factor in the patient's difficulty. Psychotherapy should be continued. Displacement therapy is suggested as a means of combating the postnasal drip.

* J.A.M.A., June 5, 1952.

FLUORIDES IN ACNE VULGARIS*

The use of fluorides as a prophylactic agent against dental cavities is widespread. However, one patient with acne vulgaris, who had a severe exacerbation of her pustular eruption, pointed out that she was taking a fluoride tablet as a preventative against dental caries. It seemed advisable to discontinue the use of fluoride in this patient, and a study was conducted to determine if fluoride tablets have any deleterious effects on the eruption of acne vulgaris. Lozenges containing calcium fluoride 0.002 gm., ascorbic acid 0.03 gm., vitamin D 400 U. S. P. units, and synthetic flavoring were given to 20 patients with acne. Once a day one lozenge was held in the mouth until dissolved. These were taken for from 1 to 11 weeks, the average being about 6 weeks. Other remedies were continued, since harmful rather than beneficial results were anticipated. In no instance did the acne lesions become severer while the patient was taking the fluoride lozenges, and 45% of the patients improved while receiving this medication. However, of 20 controls who received no fluoride lozenges, but otherwise the same treatment, 55% improved. The author feels that this study emphasizes the necessity of controls in evaluating therapeutic agents. On the face of it, the beneficial results obtained while the subjects were taking the fluoride lozenges approached those obtained with certain highly endorsed remedies

for acne. However, comparison with the control series indicates that the lozenges studied neither irritated nor improved the eruptions.

* Abstract from J.A.M.A., March 22, 1952.

EVIDENCE: MISLEADING STATEMENTS IN DENTIFRICE ADVERTISING*

This was a petition to review an order of the Federal Trade Commission. The order forbade, as misleading and likely to deceive the general public, certain advertising by the petitioner in regard to his toothpaste. The case was heard in the United States Court of Appeals, fourth circuit.

The petitioner represented in advertisements (1) that, according to a national survey conducted in 1940 among thousands of dentists, twice as many dentists personally used Ipana toothpaste as any other dentifrice and (2) that more dentists recommend Ipana for their patients' daily use than the next two dentifrices combined. These advertisements, according to the evidence, were based upon the answers to a questionnaire sent by the petitioner in 1940 "to each of 10,000 dentists out of 66,000 in the United States picked at random from the subscribers to two dental magazines." The questionnaires asked (1) What dentifrice do you personally use most often? (2) What dentifrice do you most often recommend to your patients? In reply 1,983 questionnaires were received which contained 2,467 replies to the first and 2,364 replies to the second question. The replies exceeded the questionnaires in number because some dentists named more than one product in their answers. Of the 2,467 replies to the first question, 621 dentists replied that they used Ipana most often, whereas the four nearest competing products were preferred by 258, 189, 144 and 128 dentists respectively. In answer to the second question, 461 dentists indicated that they most often recommended Ipana to their patients while the four nearest competing products were preferred by 195, 125, 106 and 94 dentists respectively. Of the 461 dentists who recommended Ipana to their patients, 413 used it themselves and 48 did not use it. Other surveys conducted in 1941 and 1944 revealed substantially similar situations. Based upon the results of the survey, the petitioner published advertisements from which the casual reader would reasonably infer that careful inquiry amongst members of the dentist profession had disclosed that a large majority of the dentists in this country not only used Ipana for themselves but recommended it to their patients.

We are of the opinion, said the court, that the sweeping statements made in the petitioner's advertisements were not justified by the answers to the questionnaire and that in consequence the advertisements were misleading and likely to deceive the general public. Certainly the average reader would not infer that the "positive proof" in the hands of the petitioner disclosed that personal preference of only 621 dentists and the customary recommendation on toothpaste to patients by only 461 dentists out of the 66,000 dentists in the United States, or that less than 20% of those who had been questioned had taken the trouble to reply, so that the use and practice of the remaining 80% were unknown. It may well be, the court continued, that an accurate estimate of public opinion or practice can be obtained by a sampling process or survey, but the record is devoid of information on this subject and in the absence of the proof of the scientific principles, if any, which underlie the practice, we must rely upon the impression which the advertisements would be likely to make upon the mind of a man of ordinary intelligence. This is not to express the opinion, concluded the court, that all advertisements based upon surveys must be barred, but merely that the information in the possession of the manufacturer in this case was insufficient to support its advertisements.

The Commission's order to which the petitioner takes exception also contained findings in respect to advertisements which represented to the public that the modern American diet consists of such soft, well-cooked foods that the gums do not get the exercise and stimulation which they need, and that massage with Ipana will provide such exercise and stimulation, and will make the gums firm and healthy, guard against "Pink Tooth Brush," a bleeding of the gums sometimes due to disease, and prevent gum trouble generally. The Commission's order was based upon findings that the preponderant weight of qualified dental opinion established the following facts: It is immaterial to the health of the gums whether the diet of a person is soft or coarse, and the modern American diet provides sufficient gum stimulation. The term "massage," as used by dentists, means a careful downward stroking or squeezing pressure applied to a quarter inch of the gum margin and teeth. The term "massage," as used in the manufacturer's advertisements, means to the general public a horizontal, vertical or rotary scrubbing of the teeth and the gums with the brush, or a similar rubbing with the finger. Such uninstructed massage, either with or without Ipana or any other toothpaste, does not stimulate circulation in the gums, impart firmness thereto, or prevent gum trouble in general or pink tooth brush in particular. Even carefully instructed and properly performed massage is not needed in a mouth free from disease, and a layman is unable to ascertain whether or not he is in need of massage. Ipana toothpaste is a cleansing agent only, without therapeutic value, and possesses prophylactic value only insofar as it cleanses.

The petitioner contends that these findings were not supported by substantial evidence insofar as they state that the use of Ipana in connection with massage has no beneficial effect. The testimony in support of the findings was given by four expert dentists who were distinguished in their profession and had published numerous articles in leading dental and medical journals. Two of them had published textbooks on dentistry. In opposition the petitioner produced one witness who had been educated in medicine, had been a medical director in industry and in the army and was employed by the petitioner at the time of the trial. His testimony differed in material points from that of the Commission's experts. In our opinion, said the court, the Commission was justified in giving preference to the testimony of the experts who supported the allegations of the complaint and who, so far as the evidence shows, were the persons best qualified in the field to form a trustworthy judgment upon the matters under investigation. Opinion evidence based on the general medical and pharmacological knowledge of qualified experts has often been held to constitute substantial evidence, even if the experts have had no personal experience with the product, and this has been done even where witnesses who had personally observed the effects of the product testified to the contrary. Accordingly the order of the Federal Trade Commission forbidding the use of the Advertisements in question was affirmed.—*Bristol-Myers Co. v. Federal Trade Commission, 185 F. (2) 58 (1950).*

* Medicolegal abstract from J.A.M.A., Dec. 1, 1951, p. 1382.

FLUORIDES IN TABLE SALT*

To the Editor: Would it not be less wasteful to put fluorine in minute amounts in our table salt, as has been done with iodine, than to put it in the water supply? Such a small quantity of the water in the mains ever reaches a person's digestive tract, but most of the salt in salt shakers eventually does.

Z. F. ENDRESS, M.D., Pontiac, Mich.

ANSWER. — Caries inhibition by fluoride (about 1 ppm of fluorine) in drinking water has been studied in great detail. No comparable information is available for judging the effect of fluoride added to table salt. The known variations in the consumption of salt by different persons suggests that the latter procedure would not be satisfactory. Furthermore, many drinking waters naturally contain adequate fluoride, and the use of a fluoridized salt would be undesirable in these cases. It is more logical to add iodine to salt, because iodides have a much wider margin of safety than do fluorides. The wastefulness of adding fluoride to a water supply is more apparent than real. The added materials are readily available and inexpensive, and also the labor involved in a carefully controlled program is negligible when computed in terms of the individual child.

* J.A.M.A., June 5, 1952.

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